UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,405	08/22/2003	Wei Wang	AMAT/3177.D1/CPI/L/B/PJS	9508

44257 7590 11/02/2007
PATTERSON & SHERIDAN, LLP
3040 POST OAK BOULEVARD, SUITE 1500
HOUSTON, TX 77056

EXAMINER	
MCDONALD, RODNEY GLENN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
11/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/646,405	WANG ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-12 and 14-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-12 and 14-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6, 8-12 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (EP 0 758 1148 A2) in view of Sone (U.S. Pat. 6,451,184) and Gilboa et al. (U.S. Pat. 5,108,569).

Regarding claim 1, Xu et al. teach a method of depositing metallic film layers on a substrate comprising introducing a first gas is introduced proximate a sputtering target disposed inside the vacuum chamber, wherein the sputtering target is made of a material made of titanium. Applying power to the sputtering target and a coil disposed between the sputtering target and the substrate in the presence of only the first gas. A

second gas is introduced into the chamber as sputtering and ionization continues. The second gas is introduced proximate the surface of the substrate in the presence of power applied to the sputter target and to the coil since sputtering and ionization continues. A power of 1.5 KW at 2 MHZ was applied to the coil. 5 KW power was applied to the titanium target. The substrate is biased by an AC bias of 90 Watts at 350 kHz resulting in a DC self bias of 70V. (Column 13 lines 46-58; Column 14 lines 1-9; Column 15 lines 15-32)

Regarding claim 2, the substrate and the coil is biased. (Column 15 lines 15-32)

Regarding claim 3, the second gas is introduced proximate to the upper surface of the substrate. (Column 13 lines 46-58; Column 14 lines 1-9) Here "proximate" is a relative term and introducing nitrogen gas into the chamber would qualify as "proximate" to the substrate.

Regarding claim 4, the power is applied to the sputter target and the coil to initiate plasma. (Column 13 lines 46-58; Column 14 lines 1-9)

Regarding claim 6, the first gas is introduced to encourage gas stabilization. (Column 13 lines 46-58; Column 14 lines 1-9)

Regarding claim 8, the first gas can be argon. (Column 15 lines 28-31)

Regarding claim 9, the second gas can be nitrogen. (Column 15 lines 29-30)

Regarding claim 10, the first gas is inert. (Column 15 lines 28-31)

Regarding claim 11, the gas is an active gas such as nitrogen. (Column 15 lines 29-30)

Regarding claim 12, the second gas is introduced after the power is applied to the sputtering target and the coil. (Column 13 lines 46-58; Column 14 lines 1-9)

The difference between Xu et al. and the present claims is that the first inlet port disposed proximate a sputtering target is not discussed (Claims 1), the second inlet port disposed proximate the substrate is not discussed (Claims 1), where the first gas creates a higher partial pressure of first gas proximate to the sputtering target than at the upper surface of the substrate is not discussed (Claim 15), where the second gas creates a higher partial pressure of second gas proximate to the surface of the substrate than at the upper surface of the target is not discussed (Claim 16), the use of a shield ring and shield support member is not discussed (Claims 1, 17).

Regarding the first inlet port disposed proximate a sputtering target and the second inlet port disposed proximate the substrate (Claim 1), Sone et al. teach in Fig. 1 for example providing a first inlet port disposed proximate a sputtering target for providing a sputter gas (Column 6 lines 5-7; Column 8 lines 57-58) and providing a second inlet port disposed proximate to a substrate for providing a reactive gas. (Column 6 lines 7-9; Column 8 lines 59-60)

The motivation for utilizing the features of Sone is that it allows for producing a uniform film. (Column 3 lines 22-25)

Regarding claims 15 and 16, Sone teaches partitioning the gas space such that reactive gas is contained between the partition member and the substrate and the sputter gas is maintained between the target and the partition member. This keeps the partial pressure of reactive gas higher at the substrate surface than at the target surface

and keeps the partial pressure of argon gas higher at the target surface than at the substrate surface. (See Abstract) Furthermore, Sone recognizes that the prior art has attempted to keep the sputtering gas confined to the target and the reactive gas confined to the substrate. (Column 2 lines 17-22)

The motivation for utilizing a high sputtering gas pressure at the target and a higher reactive gas pressure at the substrate is that it allows for production of compound films with in-plane uniform thickness and optical and electrical characteristics. (Column 3 lines 22-25)

Regarding the shield ring and support member (Claims 1, 17), Gilboa et al. teach a shield ring and shield support member in Fig. 2 such that when the shield ring is supported by the substrate support member a gas can be introduced to the upper surface of the substrate. (See Gilboa et al. Fig. 2)

The motivation for utilizing a shield ring and shield support member is that it allows for clamping the wafer to the substrate support. (Column 8 lines 37-38)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by utilizing the features of Sone et al. and Gilboa et al. because it allows for production of compound films with in-plane uniform thickness, optical and electrical characteristics and for introducing a gas to the top surface of the substrate.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone et al. and Gilboa et al. as applied to claims 1-4, 6, 8-12, 15-17 above, and further in view of Lantsman (U.S. Pat. 5,830,330).

Xu et al. is discussed above and all is as applies above. (See Xu et al. discussed above)

The difference between Xu et al. and the present claims is the ramping of the power to the target and coil. (Claim 7)

Regarding claim 7, Lantsman teach in Fig. 3 ramping the power to the target and coil to perform sputtering. (See Fig. 3)

The motivation for ramping the powers to the coil and target is that it allows for sustaining the plasma at low pressures. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by ramping the power to the coil and target as taught by Lantsman because it allows for sustaining the plasma at low pressures.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone et al. and Gilboa et al. as applied to claims 1-4, 6, 8-12, 15-17 above, and further in view of Ngan (EP 0 840 351).

Xu et al. is discussed above and all is as applies above. (See Xu et al. discussed above)

The difference between Xu et al. and the present claims is the coil made of titanium.

Regarding claim 14, Ngan teach utilizing a target and coil made of titanium. (Column 12 lines 40-43)

The motivation for utilizing a target and coil made of a material such as titanium is that it allows for depositing a layer more uniformly. (Column 9 lines 5-8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by utilizing a target and coil made of a material such as titanium as taught by Ngan because it allows for depositing a layer more uniformly.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone et al. as applied to claims 1-4, 6, 8-12, 15-17 above, and further in view of Chikako et al. (Japan 06-041733).

Xu et al. is discussed above and all is as applies above. (See Xu et al. discussed above)

The difference between Xu et al. and the present claims is that the introduction of reactive gas through the central portion of the substrate holder.

Regarding claim 18, Chikako et al. teach introducing reactive gas through the center of a substrate holder. (See Abstract; Figure 1)

The motivation introducing the reactive gas through the center of the substrate is that it allows for suppressing reaction products from building up on the surface of the target. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by utilizing a reactive gas inlet at the center of the substrate holder as taught by Chikako et al. because it allows for suppressing reaction products from building up on the surface of the target.

Claims 19-22, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (EP 0 758 148 A2) in view of Sone (U.S. Pat. 6,451,184), Yamaguchi (U.S. Pat. 6,203,674) and Gilboa et al. (U.S. Pat. 5,108,569).

Xu et al. is discussed above and all is as applies above. (See Xu et al. discussed above)

The differences not yet discussed is that the first inlet port disposed proximate a sputtering target is not discussed, the second inlet port disposed proximate the substrate is not discussed, where the first gas creates a higher partial pressure of first gas proximate to the sputtering target than at the upper surface of the substrate, where the second gas creates a higher partial pressure of second gas proximate to the surface of the substrate than at the upper surface of the target and the deposition of metallic layers and the use of a shield ring and shield support member.

Sone et al. teach in Fig. 1 for example providing a first inlet port disposed proximate a sputtering target for providing a sputter gas (Column 6 lines 5-7; Column 8 lines 57-58) and providing a second inlet port disposed proximate to a substrate for providing a reactive gas. (Column 6 lines 7-9; Column 8 lines 59-60)

The motivation for utilizing the features of Sone is that it allows for producing a uniform film. (Column 3 lines 22-25)

Sone teaches partitioning the gas space such that reactive gas is contained between the partition member and the substrate and the sputter gas is maintained between the target and the partition member. This keeps the partial pressure of reactive gas higher at the substrate surface than at the target surface and keeps the

partial pressure of argon gas higher at the target surface than at the substrate surface. (See Abstract) Furthermore, Sone recognizes that the prior art has attempted to keep the sputtering gas confined to the target and the reactive gas confined to the substrate. (Column 2 lines 17-22)

The motivation for utilizing a high sputtering gas pressure at the target and a higher reactive gas pressure at the substrate is that it allows for production of compound films with in-plane uniform thickness and optical and electrical characteristics. (Column 3 lines 22-25)

Regarding the deposition of metallic film layers, Yamaguchi teach depositing a metallic mode TiN film by sputtering a target containing a layer amount of Ti components. The selective formation of metallic mode TiN film can be performed by adjusting the ratio of Ar gas and N_2 gas or setting the flow rate of N_2 to a predetermined rate or more. (Column 3 lines 1-13)

The motivation for depositing a metallic mode TiN film is that it allows for forming a layer for a semiconductor device. (Column 1 lines 5-20)

Regarding the use of a the use of a shield ring and shield support member, Gilboa et al. teach a shield ring and shield support member in Fig. 2 such that when the shield ring is supported by the substrate support member a gas can be introduced to the upper surface of the substrate. (See Gilboa et al. Fig. 2)

The motivation for utilizing a shield ring and shield support member is that it allows for clamping the wafer to the substrate support. (Column 8 lines 37-38)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by the features of Sone and depositing metallic layer as taught by Yamaguchi and to have utilized the features of Gilboa et al. because it allows for production of compound films with in-plane uniform thickness and optical and electrical and for forming a layer for a semiconductor device and clamping the wafer to the support.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone, Yamaguchi and Gilboa et al. and further in view of Maniv et al. as applied to claims 19, 20, 21, 22, 24 and 26 above, and further in view of Ngan (EP 840 351).

The difference not yet discussed is where the coil is made of titanium (Claim 23).

Regarding claim 23, Ngan teach utilizing a target and coil made of titanium. (Column 12 lines 40-43)

The motivation for utilizing a target and coil made of a material such as titanium is that it allows for depositing a layer more uniformly. (Column 9 lines 5-8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a target and coil made of titanium as taught by Ngan because it allows for depositing a layer more uniformly.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone, Yamaguchi and Gilboa et al. as applied to claims 19-22, 24 and 26 above, and further in view of Chikako et al. (Japan 06-041733).

The difference not yet discussed is the use of a central port for a reactive gas centrally disposed through a substrate holder. (Claim 25)

Regarding claim 25, Chikako et al. teach introducing reactive gas through the center of a substrate holder. (See Abstract; Figure 1)

The motivation introducing the reactive gas through the center of the substrate is that it allows for suppressing reaction products from building up on the surface of the target. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a reactive gas inlet at the center of the substrate holder as taught by Chikako et al. because it allows for suppressing reaction products from building up on the surface of the target.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (EP 0 758 148 A2) in view of Sone (U.S. Pat. 6,451,184), Ngan (EP 840 351), Yamaguchi (U.S. Pat. 6,203,674) and Gilboa et al. (U.S. Pat. 5,108,569).

Xu et al. is discussed above and all is as applies above. (See Xu et al. discussed above)

The differences between Xu et al. and the present claims is the first inlet port disposed proximate a sputtering target is not discussed, the second inlet port disposed proximate the substrate is not discussed, having a higher partial pressure of argon at the target than at the substrate, having a higher partial pressure of reactive gas near the substrate than at the target, the coil made of titanium, deposition of metallic layers and the use of a shield ring and shield support member.

Regarding claim 27, Sone et al. teach in Fig. 1 for example providing a first inlet port disposed proximate a sputtering target for providing a sputter gas (Column 6 lines 5-7; Column 8 lines 57-58) and providing a second inlet port disposed proximate to a substrate for providing a reactive gas. (Column 6 lines 7-9; Column 8 lines 59-60)

The motivation for utilizing the features of Sone is that it allows for producing a uniform film. (Column 3 lines 22-25)

Regarding claim 27, Sone teaches partitioning the gas space such that reactive gas is contained between the partition member and the substrate and the sputter gas is maintained between the target and the partition member. This keeps the partial pressure of reactive gas higher at the substrate surface than at the target surface and keeps the partial pressure of argon gas higher at the target surface than at the substrate surface. (See Abstract) Furthermore, Sone recognizes that the prior art has attempted to keep the sputtering gas confined to the target and the reactive gas confined to the substrate. (Column 2 lines 17-22)

The motivation for utilizing a high sputtering gas pressure at the target and a higher reactive gas pressure at the substrate is that it allows for production of compound films with in-plane uniform thickness and optical and electrical characteristics. (Column 3 lines 22-25)

Regarding claim 27, Ngan teach utilizing a target and coil made of titanium. (Column 12 lines 40-43)

The motivation for utilizing a target and coil made of a material such as titanium is that it allows for depositing a layer more uniformly. (Column 9 lines 5-8)

Regarding the deposition of metallic film layers, Yamaguchi teach depositing a metallic mode TiN film by sputtering a target containing a layer amount of Ti components. The selective formation of metallic mode TiN film can be performed by adjusting the ratio of Ar gas and N_2 gas or setting the flow rate of N_2 to a predetermined rate or more. (Column 3 lines 1-13)

The motivation for depositing a metallic mode TiN film is that it allows for forming a layer for a semiconductor device. (Column 1 lines 5-20)

Regarding the use of a shield ring and shield support member, Gilboa et al. teach a shield ring and shield support member in Fig. 2 such that when the shield ring is supported by the substrate support member a gas can be introduced to the upper surface of the substrate. (See Gilboa et al. Fig. 2)

The motivation for utilizing a shield ring and shield support member is that it allows for clamping the wafer to the substrate support. (Column 8 lines 37-38)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Sone, to have utilized a target made of titanium and coil made of titanium as taught by Ngan, to have deposited metallic layers as taught by Yamaguchi and to have utilized the features of Gilboa et al. because it allows for depositing a layer uniformly with desired optical and electrical characteristics with increasing transparency and for depositing layers for semiconductors and for clamping the wafer to the substrate support.

Claims 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (EP 0758 148) in view of Sone (U.S. Pat. 6,451,184), Takehara (U.S. Pat. 5,340,459), Yamaguchi (U.S. Pat. 6,203,674) and Gilboa et al. (U.S. Pat. 5,108,569).

Xu et al. is discussed above and all is as applies above. (See Xu et al.)

The difference between Tadashi et al. and the present claims is that the first inlet port disposed proximate a sputtering target is not discussed, the second inlet port disposed proximate the substrate is not discussed, having a high partial pressure of an inert gas inside the vacuum chamber proximate the sputtering target than at an upper surface of the substrate is not discussed and introducing a mixture of gas near the target, introducing a second gas near the substrate is not discussed and depositing metallic layers is not discussed and the use of a shield ring and shield support member.

Sone et al. teach in Fig. 1 for example providing a first inlet port disposed proximate a sputtering target for providing a sputter gas (Column 6 lines 5-7; Column 8 lines 57-58) and providing a second inlet port disposed proximate to a substrate for providing a reactive gas. (Column 6 lines 7-9; Column 8 lines 59-60)

The motivation for utilizing the features of Sone is that it allows for producing a uniform film. (Column 3 lines 22-25)

Sone teaches partitioning the gas space such that reactive gas is contained between the partition member and the substrate and the sputter gas is maintained between the target and the partition member. This keeps the partial pressure of reactive gas higher at the substrate surface than at the target surface and keeps the partial pressure of argon gas higher at the target surface than at the substrate surface.

(See Abstract) Furthermore, Sone recognizes that the prior art has attempted to keep the sputtering gas confined to the target and the reactive gas confined to the substrate. (Column 2 lines 17-22)

The motivation for utilizing a high sputtering gas pressure at the target and a higher reactive gas pressure at the substrate is that it allows for production of compound films with in-plane uniform thickness and optical and electrical characteristics. (Column 3 lines 22-25)

Takehara teach a pipe 3 for introducing a mixture of gas near the target. Takehara teach a pipe 4 for introducing a second gas near the substrate. (See abstract)

The motivation for utilizing a mixture of gas near the target and a second gas near the substrate is that it allows for equalizing the reaction of a reactive gas with a target material above the surface of the target. (Column 1 lines 60-63)

Regarding the deposition of metallic layers, Yamaguchi teach depositing a metallic mode TiN film by sputtering a target containing a layer amount of Ti components. The selective formation of metallic mode TiN film can be performed by adjusting the ratio of Ar gas and N_2 gas or setting the flow rate of N_2 to a predetermined rate or more. (Column 3 lines 1-13)

The motivation for depositing a metallic mode TiN film is that it allows for forming a layer for a semiconductor device. (Column 1 lines 5-20)

Regarding the use of a shield ring and shield support member, Gilboa et al. teach a shield ring and shield support member in Fig. 2 such that when the shield ring is

supported by the substrate support member a gas can be introduced to the upper surface of the substrate. (See Gilboa et al. Fig. 2)

The motivation for utilizing a shield ring and shield support member is that it allows for clamping the wafer to the substrate support. (Column 8 lines 37-38)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Xu et al. by utilizing the features of Sone et al., to have introduced a mixture of gas near the target and a second gas near the substrate as taught by Takehara, to have deposited metallic layers as taught by Yamaguchi and to have utilized a shield ring and shield support member as taught by Gilboa et al. because it allows for producing uniform thin films and for equalizing the reaction of a reactive gas with a target material above the surface of the target, for depositing metallic layers for semiconductors and allows for clamping the wafer to the substrate support.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. in view of Sone et al., Takehara, Yamaguchi and Gilboa et al. as applied to claims 28-31 above, and further in view of Ngan (EP 840 351).

The differences not yet discussed are where the target is made of titanium, tantalum or tungsten and where the coil is made of titanium, tantalum and tungsten.

Regarding claim 32, Ngan teach utilizing a target and coil made of titanium. (Column 12 lines 40-43)

The motivation for utilizing a target and coil made of a material such as titanium is that it allows for depositing a layer more uniformly. (Column 9 lines 5-8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a target and coil made of titanium as taught by Ngan because it allows for depositing a layer more uniformly.

Response to Arguments

Applicant's arguments filed August 31, 2007 have been fully considered but they are not persuasive.

In response to the argument that the prior art does not teach supplying power to a sputtering target and a coil disposed between a sputtering target and a substrate positioned on a substrate support member in the presence of only a first gas, it is argued that Xu teach supplying power to a sputtering target and a coil in the presence of only argon (i.e. the first gas) to deposit a layer of titanium. Subsequently in the same chamber a layer of titanium nitride is deposited utilizing argon and nitrogen gas. (See Xu discussed above)

In response to the argument that the prior art does not teach introducing a second gas into a chamber to deposit metal containing film layers, wherein the second gas is introduced through an second inlet port disposed proximate a surface of the substrate in the presence of power applied to a sputter target and a coil, wherein the second gas from the second inlet port is supplied through a gap defined between a shield ring and substrate support member, it is argued that Xu suggest utilizing argon and nitrogen in a second step to deposit a TiN layer on the titanium layer in the same chamber. Sone teach separating the sputtering gas and reactive gas so that a second gas is introduced proximate the substrate from a second inlet. Gilboa et al. teach

providing a gas inlet in the form of a gap defined between a shield ring and a substrate support member. (See Xu. Sone and Gilboa et al. discussed above)

In response to the argument that there is no motivation to modify Sone, it is argued that Gilboa et al. teach that the motivation to utilize a gas means such as Gilboa et al's is that it allows for additionally clamping the substrate. (See Gilboa et al. discussed above)

In response to the argument that the prior art of record does not teach creating a higher partial pressure of an active gas introduced through a second inlet port disposed proximate an upper surface of a substrate than at a sputtering target to deposit metal containing film layers in the presence of the power applied to the sputter target and the coil, wherein the active gas from the second inlet port is supplied through a gap defined between a shield ring and the substrate support member, it is argued that Sone et al. teach creating a higher partial pressure of active gas near the substrate surface than at the target. Gilboa et al. suggest introducing gas between a gap defined between a shield ring and a substrate support member. (See Sone et al. and Gilboa et al. discussed above)

In response to the argument that the prior art of record does not teach supplying a second gas through a gap defined between a shield ring and a substrate support member, it is argued that Gilboa et al. teach supplying a second gas through a gap defined between a shield ring and a substrate support member. (See Gilboa et al. discussed above)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
October 29, 2007